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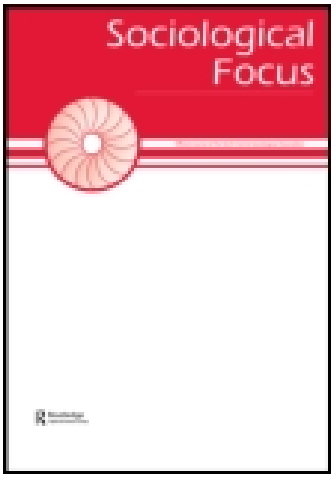

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POSTTRAUMATIC STRESS DISORDER: DIAGNOSIS, PREVALENCE, AND RESEARCH ADVANCES*

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The World Trade Center and Pentagon bombings and the Pennsylvania aircraft crash of September 11, 2001,were events of horrific magnitude, occurring in tremendously rapid succession and telecast and watched repeatedly around the world. Catastrophic events of war and organized violence, including terrorism, dramatically disrupt the fabric and order of a society, presenting vivid proof of the vulnerability of its members, threatening psychological adaptation and mental health, and cultivating a culture of fear. Research documents high rates of psychological difficulties in the majority of individuals exposed to such events, including depression, anxiety, guilt, pathological grief reactions, restlessness, sleep disturbances, psychosomatic complaints, and posttraumatic stress disorder. The relatively new diagnosis of *Posttraumatic Stress Disorder*, or PTSD, has received much attention in analysis of the mental health impact of the events of September 11. In this paper, research on PTSD is reviewed and related to the terrorist attacks of September 11, and some research areas requiring further attention are examined..

PTSD: DEFINITION AND PREVALENCE

Posttraumatic stress disorder was introduced into psychiatric nomenclature as an official diagnosis, under the larger classification of *anxiety disorders*, with the publication of the third edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, or the *DSM-III* (APA 1980). Prior to its official recognition as a psychiatric disorder, PTSD had been variously referred to as post-Vietnam syndrome, battle fatigue, shell shock, exhaustion, or accident or traumatic neurosis and was typically studied among adult male war combatants and veterans. However, researchers and clinicians became increasingly aware of the expression of traumatic stress responses in civilian populations, including children and adolescents, experiencing extreme stressors or cataclysmic events. The PTSD diagnosis continues

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to be reflected in current DSM nosology. The diagnosis has been refined over time and is likely to be further delineated given the increasing size and diversity of populations exposed to massive trauma, including the terrorist attacks of September 11. As described in the DSM-IV:

> The essential feature of Posttraumatic Stress Disorder is the development of characteristic symptoms following exposure to an extreme traumatic stressor involving direct personal experience of an event that involves actual or threatened death or serious injury, or other threat to one's physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate (Criterion A1). The person's response to the event must involve intense fear, helplessness, or horror (or in children, the response must involve disorganized or agitated behavior) (Criterion A2). The characteristic symptoms resulting from the exposure to the extreme trauma include persistent reexperiencing of the traumatic event (Criterion B), persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (Criterion C), and persistent symptoms of increased arousal (Criterion D). The full symptom picture must be present for more than 1 month (Criterion E), and the disturbance must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning (Criterion F) (American Psychiatric Association 1994, p. 424).

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PREVALENCE OF POSTTRAUMATIC STRESS DISORDER

A majority of research findings reporting on the prevalence of PTSD are based on DSM formulations and assessments of the construct. Some of the general population epidemiological data were collected during the second wave of the Epidemiologic Catchment Area (ECA) study conducted in the United States (Davidson et al. 1991; Kessler et al. 1997; Robins and Regier 1991). *Lifetime* prevalence rates among adults, using the Diagnostic Interview Schedule (Robins et al. 1981), were estimated in the St. Louis sample of 2,493 respondents (Helzer, Robins, and McEvoy 1987) and 1.3 percent among the 2,985 respondents at the Duke site in North Carolina (Davidson et al. 1991). Rates were substantially higher when examined among those who experienced a physical attack (3.5 percent) and among war veterans (6.3 percent) in the St. Louis ECA sample. In a subsequent general population study conducted in the United States, the National Comorbidity Survey (NCS; N = 8,098), a prevalence rate of 7.8 percent was reported using the Composite International Diagnostic Interview (Robins et al. 1988).

Studies of at-risk populations reported PTSD prevalence rates between 30 and 90 percent for those who satisfied the DSM diagnostic *Criterion A*, or the traumatic event criterion. Those studied have included Vietnam, World War II, and Korean War veterans, Holocaust survivors, prisoners of war, victims of natural disasters, war-exposed civilians and immigrants and refugees, victims of terrorist attacks, and victims of sexual abuse (Ayalon 1983; Brown and Anderson 1991; Eaton, Sigal, and Weinfeld 1982; Favaro et al. 1999a, 1999b; Kinzie et al. 1990; Kluznik et al. 1986; Kuch and Cox 1992; Ladd and Cairns 1996; Levav and Abramson 1984; Sack et al. 1994, 1995; Sutker et al. 1990; Sutker, Bugg, and Allain 1991; Yehuda, Southwick, and Giller 1992; Yehuda et al. 1995, 1996; Zeiss and Dickman 1989). Empirical results support the presentation of PTSD-associated symptoms long after being removed from the stressful context in which symptoms first occurred. It seems likely in the aftermath of the September 11 attacks that relatives of victims, public safety and rescue personnel, and media reporters at the site of the attacks may be at increased risk of PTSD. This could have important implications for psychiatric morbidity in the

New York and Washington areas. It is unclear whether the many persons who witnessed the attacks on television, many of whom initially experienced symptoms of restlessness, anxiety, and difficulty sleeping, will be affected in the long-term.

The National Vietnam Veterans Readjustment Study reported PTSD rates of 30 percent (Kulka et al. 1990) while a 9 percent rate was observed at six months upon the return of American soldiers from the Desert Storm War (Southwick et al. 1993). Terrorism-related rates of PTSD also have ranged widely. A 45 percent rate of psychiatric problems was observed among survivors six months after the Oklahoma City bombing, with 34.3 percent suffering posttraumatic stress disorder (North et al. 1999). Among children and youth studied two years later, who lived up to 100 miles from the site of the Oklahoma City bombing, 16 percent exhibited symptoms of PTSD in relation to the event (Pfefferbaum et al. 1999). In other studies of victims of terrorist attacks, rates of PTSD ranged from 10.5 percent (among the uninjured) to 40 percent, including results from the Lockerbie Pan Am Flight 103 terrorist crash, the Enniskillen bombing, and terrorist attacks occurring in France between 1982 and 1987 (Abenhaim, Dab, and Salmi 1992; Bell et al. 1988; Curran et al. 1990; Shalev 1992).

Similar variability in rates has occurred among victims of natural disaster, for whom rates of PTSD have ranged from 2 percent (Smith et al. 1986) to 80 percent (Weisaeth 1993). In studies using large, representative samples of civilian populations exposed to natural disasters, prevalence rates of PTSD were 3.6 percent among those exposed to the volcanic eruption of Mount Saint Helens (Shore, Vollmer, and Tatum 1989) and 16 percent among volunteer firefighters in Australia (McFarlane 1988). Lifetime prevalence rates of 59 and 37 percent among adults and children, respectively, were observed among those exposed to the Buffalo Creek flood disaster; 14 years later, 25 percent of the adult sample met diagnostic criteria for disorder (Green et al. 1991, 1992).

VARIABILITY IN FINDINGS

Reported rates of PTSD prevalence vary widely even among studies using similar samples exposed to similar traumas (e.g., studies of only civilians, veterans, or POWs). These data suggest that in the aftermath of September 11 attacks, symptom rates or diagnosis of PTSD are likely to vary with the type of study done, its timing, and the predisposing experiences of those exposed. Many difficulties in interpreting or synthesizing data on prevalence rates of PTSD are due to across study distinctions in (1) diagnostic or survey instruments (Green 1991; Kessler et al. 1995; Solomon and Canino 1990), (2) diagnostic criteria in effect at the time (Creamer 1989; Schwarz and Kowalski 1991), (3) the trauma events assessed (Davidson et al. 1991), (4) populations studied, and (5) analytic procedures (Kessler et al. 1997).

ATYPICALITY

In addition to methodological sources of variability in reported rates of PTSD, accurate estimation of prevalence rates of PTSD has been plagued also by the atypical nature of the posttraumatic response, comorbidity, and the relative rarity of the syndrome or disorder in the population (e.g., Breslau et al. 1998; Bromet 1996;

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Davidson and Foa 1991, Davidson and Fairbank 1993; Herman 1992; Horowitz 1986; Wilson and Raphael 1993; Yehuda and McFarlane 1995). The onset and course of the disorder are also important considerations. Many individuals experiencing trauma may exhibit contemporaneous and serious symptoms of distress without qualifying for a clinical diagnosis of PTSD but later move into this diagnostic category, sometimes with a delayed onset of nearly 10 years (Kinzie and Sack 1991).

Impairment is another factor influencing assessment of PTSD. While functioning may be impaired among those meeting diagnostic criteria for psychiatric disorder (Costello et al. 1993; Costello, Costello, and Edelbrook 1988), the reported link between psychiatric and functional status is often weak (e.g., Bird, Canino, and Rubio-Stipec 1988; Newman et al. 1996). Moreover, estimated rates of psychiatric disorders (e.g., PTSD) tend to be substantially lower when impaired functional status comprises part of the diagnostic criteria (Bird et al. 1988).

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PREDISPOSING FACTORS

Other factors may obscure accurate estimations of posttraumatic symptoms or disorders. Risks other than mere exposure to traumatic events, for example, may influence posttraumatic responses. Rates of PTSD are not commensurate with rates of exposure to trauma. Research by Breslau et al. (1991) showed the relative rarity of PTSD in comparison to prevalence rates of traumatic events, with a PTSD prevalence rate of 23.6 percent observed among 39.1 percent of 1,007 young adults who reported experiencing a traumatic event in their lifetime. In the National Comorbidity Survey, Kessler et al. (1995) reported a PTSD prevalence rate of 7.8 percent, while more than half of the adults in the sample (60.7 percent of males, 51.2 percent of females) reported trauma-related experiences in their lifetime. Factors predisposing individuals to greater exposure to traumatic events or to increased vulnerability for the disorder may account for some of the observed outcome variations. Factors associated with increased risk for PTSD include prior personal or family history of psychopathology or substance abuse, early separation from parents, early conduct or behavioral problems, previous exposure to trauma, education, and gender (e.g., Helzer et al. 1987; McFarlane 1989, 1990; Solomon and Canino 1990; Stein et al. 1988; True et al. 1993; Ursano 1981).

SOME CRITICAL ISSUES FOR FURTHER RESEARCH

THE MISMEASURE OF . . . STRESSORS IN THE ESTIMATION OF PSYCHIATRIC RISK

With a likely increase in PTSD research to address psychological responses to the September 11 attacks and with ongoing hostilities in the United States and abroad, new studies need to attempt to build upon earlier research and address issues previously understudied or ignored. Among these issues are better assessment of stressors, their independent or joint effects on mental health, and the consideration of context, development, and coping in this process. Despite converging empirical evidence that exposure to extreme adversity or trauma has immediate and long-term consequences for mental health, conceptual and methodological limitations compromise generating a more rigorous delineation of the etiological significance of trauma in

psychiatric disorders. These difficulties include inadequate assessment of traumatic stressors (Keane, Weathers, and Kaloupek 1992), including the DSM stressful event criterion for PTSD typically evaluated on a dichotomous (yes-no) basis. Measures also need to assess consistently whether individuals have previously experienced traumatic events. Accurate understanding of the emergence and course of psychiatric disorders associated with exposure to extreme stress or trauma is dependent on understanding how traumatic events exert their etiologic effects on psychiatric symptoms or disorders. Because some events may occur repeatedly or co-occur with other events, the long-term psychological impact of any single trauma is difficult to assess. Some researchers have emphasized the need to study clusters or sets of traumatic events that hang together conceptually and jointly exert their etiologic effects (e.g., Dohrenwend 1998; Gotlib and Wheaton 1997; Thoits 1983). Kessler et al. (1995) reported that among individuals experiencing a traumatic event, the majority experienced two or more traumatic events in their lifetime. Wheaton, Roszell, and Hall (1997) highlighted the hazards of deriving "estimates of risk that do not take into account . . . the attendant risk due to other stressors . . . accompanied by information on age and the ordering and spacing of occurrence of these stressors" (p. 51). Some empirical results consistent with this approach have begun to emerge. In a study of Cambodian refugee youth resettled in Oregon, the occurrence of stressful events in the resettlement period was significantly associated with a diagnosis of PTSD among previously traumatized Cambodian youth (Sack et al. 1993).

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THE INFLUENCE OF CONTEXT

The context in which traumatic events occur is another critical consideration. What are the implications for psychiatric disorder when a traumatic event occurs in high-level danger zones (e.g., war) versus peaceful areas? Risk for PTSD may be reduced when a traumatic event occurs within the context of chronic danger, such as the continuing warfare in Afghanistan. In this context an event might be anticipated, as compared to when it occurs as a discrete event in a relatively safe context (e.g., Jenkins 1996; Kirmayer, 1996; Macksoud, Dyregrov, and Raundalen 1993; Manson et al. 1996; Robin, Chester, and Goldman 1996). However, this view is not well substantiated by empirical results, and an interpretation based on risk due to accumulating stressors is equally viable. The suddenness and unexpectedness of the September 11 attacks may begin to address this issue.

Another important consideration is what happens to individuals once they are removed from the traumatic context. Some research on immigrants and refugees has supported a temporal link between the experience of stressful events and adaptation, with psychological distress due to pre-migration trauma decreasing later in the process of acculturating within a war-free milieu (Westermeyer, Neider, and Callies 1989).

CULTURAL CONSIDERATIONS

The sheer intensity of traumatic events may evoke culturally universal symptoms in the majority of individuals exposed. Symptoms associated with PTSD have been recognized in many cultures whether the syndrome, disorder, or presenting

symptoms were formally referred to as PTSD (e.g., Marsella et al. 1996). However, even within a culture, there is controversy over the definition and operationalization of the PTSD disorder. This complexity is related to evidence that individuals distressed by the disorder often present with a range of clinical symptoms varying in severity and associated impairment and that the expression of symptoms (e.g., primarily the nonbiological symptoms) might differ across cultures. The role of culture in psychiatric disorder tends to be minimized or viewed simply as a source of variation. However, cultural variations have been observed consistently in psychiatric disorders (Kleinman 1988). Ethno-cultural variations in PTSD have long been recognized, both with respect to *diagnosis* (Penk and Allen 1991; Penk et al. 1989; Westermeyer and Wahmenholm 1989) and *responses to treatment* (Kinzie 1985; Kinzie and Fleck 1987; Kinzie et al. 1980; Krippner and Colodzin 1989; Lee and Lu 1989; Parson 1985; Silver and Wilson 1990). The wide range of ethnic and racial characteristics of those who experienced the September 11 attacks may further clarify our knowledge of cultural responses.

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DEVELOPMENTAL RESEARCH

Perhaps more than any other previous event, children in the United States and abroad were exposed, either as direct witnesses or through media coverage, to a horrific series of events on September 11. The direct mental health effects for those who were personally involved in the events versus those who witnessed or were exposed to them through repeated media coverage are as yet unclear. We do know that children and adolescents exposed to various forms of extreme adversity, again with prevalence rates varying by the type of trauma and the methods of study, may present with severe posttraumatic reactions, including PTSD (e.g., Groves et al. 1993; Kinzie and Sack 1991; Macksoud and Aber 1996; Terr 1991). The immediate impact of trauma may be masked in young children whose psychological responses to adversity may be more subdued relative to adults (Garmezy and Rutter 1985). Furthermore, manifestations of posttraumatic responses among children may differ from those of adults. Symptom expression in children might entail ". . . behavioral reenactments expressed in traumatic play, dreams, story telling, music" (Jensen and Shaw 1993, p. 698). Also, comorbidity is less commonly observed in PTSD with children than with adults (Sack et al. 1993).

Despite recognition of PTSD as a disorder of childhood, several unaddressed empirical questions remain about how early exposure to extreme stress may be associated with contemporaneous and subsequent psychiatric risk. For example, what are the mechanisms and processes through which early exposure to trauma affects psychological adjustments over the life course? With some research showing how early psychological trauma influences brain development (Stein et al. 1997), how enduring are the psychiatric risks of trauma to the individual, and can risk be observed with a lengthy delay of symptom onset? Is risk transmitted intergenerationally? What factors contribute to the course of disorder or the attenuation or increase of symptoms or disorders across the life span? Follow-up investigations of Cambodian youth in the United States failed to provide evidence that diagnostic status was rigid: Some refugee youth continued to qualify for the PTSD diagnosis; others no longer met diagnostic criteria; and still others constituted new cases (Kinzie and Sack 1991). This

raises the question of whether discontinuities in diagnostic status are the hallmark of childhood psychopathology (Garber et al. 1988) or whether observed discontinuities reflect fluctuations in the course of disorder.

Previous research raises other related questions. For example, which domains of stressors most threaten adaptation? Are particular types of adversity associated with specific patterns of distress? Does age at exposure to situations of extreme adversity affect the risk of developing psychological sequelae?

Research on PTSD has neglected the potential effect that age at which the associated traumatic experience occurred might have on later psychological adjustment. Failure to consider the age at which a trauma occurred may contribute to biases in estimating the nature and scope of immediate and long-term psychological effects of early trauma. Recent clinical research demonstrates that exposure to trauma before the age of 11 years is associated with a three-fold likelihood of experiencing psychological distress in adolescence (Davidson and Smith 1990). This is consistent with other reports of vulnerability to psychopathology in children exposed to trauma at extremely young ages (Eth and Pynoos 1985; Rutter 1967), as well as findings that very young children have not sufficiently developed the cognitive capacities to cope with adversity by deriving sensical explanations for traumatic events (Garbarino et al. 1991a, b, 1992).

With less advanced cognitive capacities potentially restricting both the accurate appraisal of a stressful situation, as well as the appraisal of one's capacities to manage the event, or to regulate the attendant emotional response (Fields and Prinz 1997), age is an important consideration in research on the psychiatric consequences of stress. While the stage of cognitive development may leave young children highly vulnerable to the effects of stress, it may also serve to preclude a full understanding of the consequences or implications of events, thereby leaving them potentially protected from the impact of traumatic experiences. Research to date has not adequately addressed these issues or the long-term psychiatric risks of early exposure to trauma. By assuming that children may be shielded from the full impact of trauma through insufficiently developed resources for perceiving trauma or the appraised intensity or seriousness of events, we may be ignoring those who are the most vulnerable.

COPING WITH TRAUMA

Research addressing how people cope with trauma is relatively undeveloped. Assessing different methods of coping with trauma may capture important factors that operate to influence variations in post-trauma outcomes. However, existing theories of coping provide a well-established basis for the conceptualization of coping with trauma. Some recent studies have delineated how coping with trauma differs from coping with the kind of life stress that might be viewed as relatively less extreme (e.g., see Aldwin, 1994; Horowitz 1986; Roth and Newman 1991). Some of this literature has highlighted commonalities between coping with traumatic events and with more mundane types of stress. These include problem-focused coping, seeking social support, humor, altruism, and prayer. Coping responses that seem to be more unique to trauma are thought to be less under conscious control and may involve defense mechanisms such as denial or distortion of events. Some views suggest that attempts at regulating the attendant emotional responses to traumatic events (e.g., the use of

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emotion-focused coping) may be hindered due to posttraumatic stress reactions of emotional numbing observed among those exposed to trauma.

CONCLUSION

The September 11 attacks have increased awareness and recognition of the PTSD diagnosis and provided a context for more accurately assessing responses to traumatic stress. Overviews of diagnostic criteria and prevalence rates of Post-traumatic Stress Disorder among general population and at-risk groups of adults and youth have shown that reported rates of disorder tend to vary widely. Moreover, the variability has appeared to be primarily due to across study distinctions in diagnostic or survey instruments used to assess PTSD, diagnostic criteria in effect at the time, types of trauma events assessed, populations studied, and analytic procedures. Critical areas where research may advance understanding of the etiological significance of extreme stress or trauma in psychiatric disorder include accurate estimation of trauma exposure over the life course, the context in which traumatic events are experienced, culture, development, and coping responses.

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For additional information about PTSD and treatment options, visit websites of the National Institute of Mental Health (http://www.nimh.nih.gov/anxiety/ptsdmenu.cfm) and the National Centre for Post Traumatic Stress Disorder (http://www.ncptsd.org/terrorism/index.html).

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